135. Proposed by CHARLES C. CROSS, Whaleyville, Va.

Tangents parallel to the three sides are drawn to the in-circle. If $p$, $q$, $r$, be the lengths of the parts of the tangents within the triangle, prove that

$$\frac{p}{a}+\frac{q}{b}+\frac{r}{c}=1.$$

*** Solutions of these problems should be sent to J. M. Colaw not later than June 10.

## GEOMETRY.

163. Proposed by J. C. NAGLE, Professor of Civil Engineering in the Agricultural and Mechanical College of Texas, College Station, Texas.

Given the equal sides of an isosceles triangle and the radius of the inscribed circle to solve the triangle. As a numerical example let the known sides be 27 and the radius of the inscribed circle 3.5. The problem occured in connection with some mill work and the exterior angles of the triangle were required in order to make patterns for iron braces.

164. Proposed by J. M. HARCOURT, M. D., 305 Clinton Street, Brooklyn, N. Y.

Given two tangents to a parabola, find the locus of the center of the nine-point circle of the triangle by the two given tangents and any third tangent.

165. Proposed by W. H. ECHOLS, B.Sc., C.E., Professor of Mathematics, University of Virginia, Charlottsville, Va.

$OB=b$, $OA=a$ are the semi-conjugate diameters of an ellipse. Draw $BM$ perpendicular to and equal to $OA$, cutting it in $N$. Show that as $M$ slides on the fixed line $OM$ and $N$ on $OA$ the point $B$ traces the curve.

*** Solutions of these problems should be sent to B. F. Finkel not later than June 10.

## CALCULUS.

128. Proposed by J. SCHEFFER, A. M., Hagerstown, Md.

The differential equation of a curve is $\frac{d^3y}{dx^3}+y=0$. Find its equation, there being the additional conditions that for $x=0$, $y=1$, that the tangent at the point (0, 1) makes an angle of 45° with the axes, and finally that that point is a point of inflexion.

129. Proposed by JOHN M. COLAW, A. M., Monterey, Va.

Among all quadrilaterals inscribed in an ellipse, to determine that which contains the greatest area.

*** Solutions of these problems should be sent to J. M. Colaw not later than June 10.

## MECHANICS.

120. Proposed by W. J. GREENSTREET, M. A., Editor of The Mathematical Gazette, Stroud, Gloucestershire, England.

I project an elastic particle along a chord $c$ of a smooth fixed circular rim of diameter $d$. The coefficient of elasticity between the particle and the rim is $e$, and the particle continually rebounds. Find the length of the chord described after the $n$th rebound.